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BRIARCLIFF MANOR, NY 10510

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/537,877
Filing Date: June 07, 2005
Appellant(s): MIMNAGH-KELLEHER ET AL.

Dicran Halajian

For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 02/15/2008, to the supplemental appeal brief filed 03/03/2008 appealing from the Office action mailed 09/25/2007, and to the order returning the appeal dated 1/30/2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection, filed on 11/05/2007, contained in the brief is correct.

However, the second amendment after final rejection filed on 02/15/2008 has not been entered.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

On page 2, of the Reply Brief, filed 11/24/2008, 2nd line from the last, delete "Nicola" and replace it with --Nikolic--.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,436,052 B1	Nikolic et al.	8-2002
6,122,960	Hutchings et al.	9-2000
6,160,478	Jacobsen et al.	12-2000

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 26-35 are rejected under 35 U.S.C. 102(e) as being anticipated by Nikolic.

As to claims 26 and 27, Nikolic discloses an activity monitor/"system for sensing activity and measuring work performed by an individual"/system for measuring movement of objects/persons comprising:

a measurement unit/activity monitor (112) including a plurality of motion sensors/accelerometers (240) configured to produce sensor signals (accelerometer output) indicative of motion/acceleration of the plurality of motion sensors/accelerometers (240) (figures 1-6B; column 5, lines 2-5, 50-59); and

a processor (220)/clearinghouse (520) configured to receive the sensor signals (accelerometer output) from the measurement unit (112) and to process (add the acceleration output vector to a cumulative sum for each axis) the sensor signals (accelerometer output) as vector components of a vector to produce a magnitude of the vector using a look-up table of stored magnitudes and associated vector components (figures 1-6B; column 5, lines 5-7; column 6, lines 50-51; column 7, lines 1-31; column 9, lines 25-52; column 12, lines 43-59; column 18, lines 7-25).

As to claim 28, Nikolic discloses that the sensors/accelerometers are arranged to be mutually orthogonal (figures 1-6B; column 6, lines 42-46).

As to claim 29, Nikolic discloses that the processor is further configured to calculate the magnitude of the vector according to the following expression:

$$|a| = \sqrt{(a_x^2 + a_y^2 + a_z^2)},$$

where a_x, a_y and a_z are the vector components included in the sensor/accelerometer signals and $|a|$ is the magnitude of a resultant vector (figures 2-4, 5A, 5B; column 6, lines 43-45; column 7, lines 19-20; column 11, lines 25-36; column

12, lines 43-59; column 14, line 66 - column 15, line 4; column 17, lines 63-65; column 18, lines 7-25).

As to claims 31 and 32, Nikolic discloses a method of “sensing activity and measuring work performed by an individual”/monitoring activity of a subject/person comprising the steps of:

producing sensor signals (accelerometer output) indicative of motion of a plurality of motion sensors/accelerometers (240) (figures 1-6B; column 5, lines 2-5, 50-59); and

processing (adding the acceleration output vector to a cumulative sum for each axis) the sensor signals (accelerometer output) as vector components of a vector to produce a magnitude of the vector using a look-up table of stored magnitudes and associated vector components (figures 1-6B; column 5, lines 5-7; column 6, lines 50-51; column 7, lines 1-31; column 9, lines 25-52; column 12, lines 43-59; column 18, lines 7-25).

As to claim 33, Nikolic discloses mutually orthogonal motion sensors/accelerometers (figures 1-6B; column 6, lines 42-46).

As to claim 34, Nikolic discloses calculating the magnitude of the vector according to the following expression:

$$|a| = \sqrt{(a_x^2 + a_y^2 + a_z^2)},$$

where a_x, a_y and a_z are the vector components included in the sensor/accelerometer signals and $|a|$ is the magnitude of a resultant vector (figures 2-4, 5A, 5B; column 6, lines 43-45; column 7, lines 19-20; column 11, lines 25-36; column

12, lines 43-59; column 14, line 66 - column 15, line 4; column 17, lines 63-65; column 18, lines 7-25).

As to claims 30 and 35, Nikolic discloses calculating a direction of the vector (figures 1-6B; column 4, line 66 - column 5, line 42; column 6, lines 50-57; column 14, line 66 - column 15, line 7).

Claims 26-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hutchings in view of Nikolic.

As to claims 26 and 27, Hutchings discloses an activity monitor comprising:

a measurement unit (49) including a plurality of motion sensors/accelerometers configured to produce sensor signals (accelerometer output) indicative of motion/acceleration of the plurality of motion sensors/accelerometers (note: column 25 erroneously refers to unit (49) as unit (48)) (figure 16; column 23, line 66 - column 24, line 21; column 25, lines 3-25); and

a processor (52)/microprocessor (56) configured to receive the sensor signals (accelerometer output) from the measurement unit (49) and to process (measure a distance traversed and the speed of object) the sensor signals (accelerometer output) as vector components of a vector to produce a magnitude of the vector (figures 3-5, 8-14, 16; column 9, lines 17-64; column 10, lines 54-61; column 24, lines 16-22; column 25, lines 60-61; column 27, lines 29-37; equations 23, 32).

As to claims 31 and 32, Hutchings discloses a method of monitoring activity comprising the steps of:

producing sensor signals (accelerometer output) indicative of motion of a plurality of motion sensors/accelerometers (figure 16; column 23, line 66 - column 24, line 21; column 25, lines 3-25); and

processing (measure a distance traversed and the speed of object) the sensor signals (accelerometer output) as vector components of a vector to produce a magnitude of the vector (figures 3-5, 8-14, 16; column 9, lines 17-64; column 10, lines 54-61; column 24, lines 16-22; column 25, lines 60-61; column 27, lines 29-37; equations 23, 32).

As to claims 26 and 31, Hutchings does not expressly disclose using a lookup table of stored magnitudes and associated vector components.

The disclosure set forth above for the rejection of claims 26-35 is relied upon. Nikolic teaches a "method and system for sensing activity and measuring work performed by an individual" including accelerometer data being stored on a storage device (250) and further processing accelerometer output/signals by using a look-up table of stored magnitudes and associated vector components (column 6, lines 50-51; column 7, lines 20-30).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hutchings's apparatus/method to include using a look-up table of stored magnitudes and associated vector components to process the sensor/accelerometer output/signals, as suggested by Nikolic, because this would enable a later access of these values for further calculations or comparative analyses (Hutchings, column 25, lines 35-37).

As to claims 28 and 33, Hutchings discloses mutually orthogonal accelerometers.

As to claims 29 and 34, Hutchings discloses calculating the magnitude of the vector according to the following expression:

$$|a| \text{ (or } |g|) = \sqrt{(a_x^2 + a_y^2 + a_z^2)},$$

where a_x, a_y and a_z are the vector components included in the sensor/accelerometer signals and $|a|$ (or $|g|$) is the magnitude of a resultant vector (column 15, lines 22-30; equation 25; column 23, lines 66-67).

As to claims 30 and 35, Hutchings discloses calculating a direction of the vector (column 3, lines 52-59; column 9, lines 28-36).

Claims 26-28, 30-33 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobsen in view of Nikolic.

As to claims 26 and 27, Jacobsen discloses an activity monitor comprising:

a measurement/monitoring unit (50) including a plurality of motion sensors (58, 60)/"at least one accelerometer" (58)/"plurality of accelerometers" configured to produce sensor signals (accelerometer output) indicative of motion/acceleration of the plurality of motion sensors/accelerometers (58, 60) (figure 2; column 3, lines 7-14; column 5, lines 25-30); and

a processor/processing unit (54) configured to receive the sensor signals (accelerometer output) from the measurement unit (50) and to process/interpret the sensor signals (accelerometer output) as vector components of a vector to produce a

magnitude of the vector (figure 2; column 3, lines 15-47; column 5, lines 25-67; column 6, lines 1-22).

As to claims 31 and 32, Jacobsen discloses a method of monitoring activity comprising the steps of:

producing sensor signals (accelerometer output) indicative of motion of a plurality of motion sensors/accelerometers (58, 60) (figure 2; column 3, lines 7-14; column 5, lines 25-30); and

processing/interpreting the sensor signals (accelerometer output) as vector components of a vector to produce a magnitude of the vector (figure 2; column 3, lines 15-47; column 5, lines 25-67; column 6, lines 1-22).

As to claims 26 and 31, Jacobsen does not expressly disclose using a lookup table of stored magnitudes and associated vector components.

The disclosure set forth above for the rejection of claims 26-35 is relied upon. Nikolic teaches a "method and system for sensing activity and measuring work performed by an individual" including accelerometer data being stored on a storage device (250) and further processing accelerometer output/signals by using a look-up table of stored magnitudes and associated vector components (column 6, lines 50-51; column 7, lines 20-30).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Jacobsen's apparatus/method to include using a look-up table of stored magnitudes and associated vector components to process the sensor/accelerometer output/signals, as suggested by Nikolic, because this would

enable a later access of these values for further calculations or comparative analyses (Jacobsen, column 3, lines 25-47).

As to claims 28 and 33, Jacobsen discloses "a three dimensional accelerometer", which is the equivalent of three accelerometers arranged to be mutually orthogonal (column 6, lines 45-47).

As to claims 30 and 35, Jacobsen discloses calculating a direction of the vector (column 5, lines 33-37).

(10) Response to Argument

The following is a response to arguments presented by Appellant(s) applicable to the appealed claims:

Nikolic

A careful review of Nikolic reveals that it teaches an activity monitor including a measurement unit (112) with a plurality of accelerometers (240) and a processor (220, 520) configured to receive sensor signals from accelerometers (240) and to process these signals as vector components of a vector to produce a magnitude of the vector using a look-up table having stored magnitudes and associated vector components (figures 1-6B; column 5, lines 5-7; column 6, lines 50-51; column 7, lines 1-31; column 9, lines 25-52; column 12, lines 43-59; column 18, lines 7-25).

Note that Nikolic discloses, in step (305), "the output of the accelerometer or activity is obtained…the acceleration output information…includes acceleration

information from two orthogonal axes" (column 7, lines 15-21). Further, Nikolic discloses, in step (310), "the acceleration output or data for each axis is added to a cumulative sum for the corresponding axis...[t]he acceleration data is compared to the minimum and maximum values of the information obtained in step 305...this can be done by employing a look-up table...and taking the magnitude of the resultant values" (column 7, lines 22-30).

Thus, since the acceleration data consists of acceleration information from two orthogonal axes, it is clearly in the form of vectors. Moreover, for employing a look-up table and taking a magnitude of the resultant values, the magnitudes corresponding to associated vector components (acceleration information from the two orthogonal axes) has to be inherently stored in the look-up table. Note, that the Appellant's interpretation of, "taking a magnitude of the resultant values" as calculating/determining a magnitude of the resultant values appears to be incorrect. The Examiner interprets, "taking a magnitude" as using/reading a magnitude from the look-up table and not as calculating/determining a magnitude.

Therefore, as to Appellant's argument, "the Nikolic look-up table does not store any [magnitude] but rather stores other values…the magnitude of the resultant values is determined, which magnitude is NOT determined from any magnitude values stored in the Nikolic look-up table", the Examiner disagrees.

Moreover, the claims are not restricted to such a narrow interpretation as suggested by Appellant. Instead the claims merely require a processor to process sensor signals as vectors using a lookup table which contains stored magnitudes and

associated vector components. Nikolic's look up table stores the max, the mean, and the min data for each axis. This max/mean/min reads on the claimed "lookup table having stored magnitudes". The storing of this data per axis (x, y) reads on the claimed "associated vector components". Nikolic's processor uses the data that has been stored in the lookup table and uses "equations" to produce a magnitude of each vector as required by the claims. Nowhere in the claims are "equations" excluded. How the data in the lookup table is used is not limited by the claims

As to Appellant's argument, "Nikolic calculates…the dynamic acceleration magnitude…through the use of…equations…as specifically recited on column 12, lines 43-47, and column 18, lines 9-11", the Examiner notes that Nikolic teaches using a look-up table as an option. Nikolic discloses, "[b]y way of example, this can be done by employing a look-up table…and taking the magnitude of the resultant values, or alternatively by…" (column 7, lines 22-31).

Van Wechel

As to Appellant's argument, "column 23, lines 6-8 of U.S. Patent No. 6,452,961 (Van Wechel), recited in the last paragraph of the Advisory Action of December 11, 2007, merely recites that other [methods] for computing or approximating the magnitude of a vector include the use of lookup table...this recitation of Van Wechel...[does] not teach or suggest that the lookup table stores [magnitudes] and associated vector components...as recited in independent claims 26 and 31", the Examiner disagrees.

Van Wechel's teaching, “methods for computing or approximating the magnitude of a vector include the use of lookup table”, inherently teaches a lookup table of stored magnitudes and associated vector components. The computation/approximation of the magnitude of a vector using a lookup table clearly requires the lookup table to include magnitudes and associated vector components because if the lookup table did not include the magnitude and its associated vector components, then an additional processor would be required to compute/calculate the magnitude of the vectors and this would render the lookup table useless for the intended purpose.

Hutchings in view of Nikolic

As to Appellant's arguments, “Nikolic and Van Wechel do not remedy the deficiencies in Hutchings”, the Examiner disagrees.

A careful review of Nikolic reveals that it teaches an activity monitor including a measurement unit (112) with a plurality of accelerometers (240) and a processor (220, 520) configured to receive sensor signals from accelerometers (240) and to process these signals as vector components of a vector to produce a magnitude of the vector using a look-up table having stored magnitudes and associated vector components (figures 1-6B; column 5, lines 5-7; column 6, lines 50-51; column 7, lines 1-31; column 9, lines 25-52; column 12, lines 43-59; column 18, lines 7-25).

Note that Nikolic discloses, in step (305), “the output of the accelerometer or activity is obtained…the acceleration output information…includes acceleration information from two orthogonal axes” (column 7, lines 15-21). Further, Nikolic

discloses, in step (310), “the acceleration output or data for each axis is added to a cumulative sum for the corresponding axis...[t]he acceleration data is compared to the minimum and maximum values of the information obtained in step 305...this can be done by employing a look-up table...and taking the magnitude of the resultant values" (column 7, lines 22-30).

Thus, since the acceleration data consists of acceleration information from two orthogonal axes, it is clearly in the form of vectors. Moreover, for employing a look-up table and taking a magnitude of the resultant values, the magnitudes corresponding to associated vector components (acceleration information from the two orthogonal axes) has to be inherently stored in the look-up table. Note, that the Appellant’s interpretation of, "taking a magnitude of the resultant values” as calculating/determining a magnitude of the resultant values appears to be incorrect. The Examiner interprets, “taking a magnitude” as using/reading a magnitude from the look-up table and not as calculating/determining a magnitude.

Van Wechel’s teaching, “methods for computing or approximating the magnitude of a vector include the use of lookup table”, inherently teaches a lookup table of stored magnitudes and associated vector components. The computation/approximation of the magnitude of a vector using a lookup table clearly requires the lookup table to include magnitudes and associated vector components because if the lookup table did not include the magnitude and its associated vector components, then an additional processor would be required to compute/calculate the magnitude of the vectors and this would render the lookup table useless for the intended purpose.

Jacobsen in view of Nikolic

As to Appellant's arguments, "Nikolic and Van Wechel do not remedy the deficiencies in Jacobsen", the Examiner disagrees.

A careful review of Nikolic reveals that it teaches an activity monitor including a measurement unit (112) with a plurality of accelerometers (240) and a processor (220, 520) configured to receive sensor signals from accelerometers (240) and to process these signals as vector components of a vector to produce a magnitude of the vector using a look-up table having stored magnitudes and associated vector components (figures 1-6B; column 5, lines 5-7; column 6, lines 50-51; column 7, lines 1-31; column 9, lines 25-52; column 12, lines 43-59; column 18, lines 7-25).

Note that Nikolic discloses, in step (305), "the output of the accelerometer or activity is obtained…the acceleration output information…includes acceleration information from two orthogonal axes" (column 7, lines 15-21). Further, Nikolic discloses, in step (310), "the acceleration output or data for each axis is added to a cumulative sum for the corresponding axis...[t]he acceleration data is compared to the minimum and maximum values of the information obtained in step 305...this can be done by employing a look-up table...and taking the magnitude of the resultant values" (column 7, lines 22-30).

Thus, since the acceleration data consists of acceleration information from two orthogonal axes, it is clearly in the form of vectors. Moreover, for employing a look-up table and taking a magnitude of the resultant values, the magnitudes corresponding to

associated vector components (acceleration information from the two orthogonal axes) has to be inherently stored in the look-up table. Note, that the Appellant's interpretation of, "taking a magnitude of the resultant values" as calculating/determining a magnitude of the resultant values appears to be incorrect. The Examiner interprets, "taking a magnitude" as using/reading a magnitude from the look-up table and not as calculating/determining a magnitude.

Van Wechel's teaching, "methods for computing or approximating the magnitude of a vector include the use of lookup table", inherently teaches a lookup table of stored magnitudes and associated vector components. The computation/approximation of the magnitude of a vector using a lookup table clearly requires the lookup table to include magnitudes and associated vector components because if the lookup table did not include the magnitude and its associated vector components, then an additional processor would be required to compute/calculate the magnitude of the vectors and this would render the lookup table useless for the intended purpose.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Samir M. Shah/ (05/13/2008)

Conferees:

/Brian Sircus/
Brian Sircus
TQAS TC 2800

Hezron Williams (05/13/2008)

/Hezron Williams/

Supervisory Patent Examiner, Art Unit 2856

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